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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/601,801	06/20/2003	Kenneth G. Brown	LAR 15712-2-CU	8170

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
MAIL STOP 141
HAMPTON, VA 23681-2199

EXAMINER	
SODERQUIST, ARLEN	

ART UNIT	PAPER NUMBER
1743	

DATE MAILED: 11/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/601,801	BROWN ET AL.	
	Examiner	Art Unit	
	Arlen Soderquist	1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 August 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 June 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Timoshenko (US 4,164,699) in view of Moseley (GB 2,167,192 newly cited and applied) or Kim (newly cited and applied). In the patent Timoshenko teaches a thermochemical combustible gas detector having a resistor bridge including a thermistor which is sensitive to combustible gases and a thermistor which compensates the effects of unmeasured parameters and components upon the former thermistor. The proposed thermochemical combustible gas detector comprises a resistor bridge (1) shown in figure 1. Two adjacent arms of said resistor bridge include thermistors (2,3). One thermistor (2), is sensitive to the presence of combustible gases in the atmosphere, whereas the other thermistor (3) is intended to compensate for the effects of unmeasured parameters and components of the atmosphere upon the sensitive thermistor. The two remaining adjacent arms of said bridge include conventional resistors (4,5). The sensitive thermistor may be a coil, preferably of platinum wire, which at a certain temperatures acts as a catalyst for combustible gases and vapors. The compensating thermistor is also a platinum wire coil. In order to avoid the catalytic action of this thermistor, it is coated with a catalytically inert compound. The same effect can be attained by making this thermistor from thick wire in order to reduce its temperature to a point at which platinum is inert, or by using a greater winding pitch in this thermistor compared to that of the sensitive thermistor. In order to bring down the working temperature of the sensitive thermistor and prolong its service life, the thermistor can be coated

with a thin film of a catalytically active compound, which accounts for a lower oxidation temperature of combustible gases, as compared to platinum. In this case the compensating thermistor needs no coating. An alternative embodiment for the thermistors is platinum coils arranged either inside or on the surface of cylinders of a porous material, preferably active aluminum oxide. The coils can also be arranged in spherical granules of the same porous material. In order to ensure catalytic activity of the sensitive thermistor, it is treated with a catalytic compound. Timoshenko does not teach any particular type of catalyst or the resistance of the thermistors.

In the published application Moseley teaches a gas sensor. The sensor includes a Seebeck effect semiconductor oxide material or sulphide-sensing material having two regions. One region catalyzes a chemical reaction, causing a temperature differential with the second region resulting in a Seebeck effect voltage (thermistor). Specific Seebeck effect materials are SnO_2, V_2O_5, Cr_2O_3, $BaTiO_3$ and MoS_2. The sensor is taught for detecting hydrogen, carbon monoxide, ethylene (C_2H_4, an organic compound) or hydrogen sulphide (all are claimed). An advantage is that the sensors do not require external power supply and can operate at room temperature. The sensors are also resistant to moisture poisoning. Examples 1-7 show the response of a sensor to hydrogen. The sensor is described on page 2, lines 83-97. The sensor device had a pellet of tin dioxide having a region having a Pt-Pd catalyst. Two Au electrodes were sputtered onto opposite end faces of the pellet (i.e. one electrode was formed on a Pt-Pd catalyst and one electrode was formed on a region not having a catalyst). The electrodes were connected to a voltage measuring device (DVM) via Cu wires. The pellet was formed by pressing a layer of tin dioxide powder and a layer of tin dioxide powder mixed with powdered platinum and palladium in a die. The pellet after pressing had a region of porous tin dioxide and a region of porous tin dioxide provided with a platinum-Pd catalytic material..

In the paper Kim teaches a tin oxide-based methane gas sensor promoted by alumina-supported Pd catalyst. In an attempt to promote the sensitivity of tin oxide-based sensors to methane gas, the parent tin oxide powder, pure or loaded with Ca and/or Pt (0.1%), was mixed with a fixed amount (5%) of alumina-supported Pd catalyst (net Pd loading 0.25%). The resulting sensor was found to exhibit excellent sensing properties to methane in the concentration range of 500-10,000 ppm at 658 K regardless of the difference in starting tin oxide powder. It

gave higher sensitivity to methane than any other sensors for which the tin oxide powder was either mixed similarly with supported Pt, Rh or Ni catalyst or loaded with the same amount of Pd by conventional methods. The high dispersion of Pd (or PdO) particles appears to be responsible for the excellent promoting action of the supported Pd catalyst. At lower temperature of 573 K, however, the use of the Ca and/or Pt loaded powder of tin oxide gave higher sensitivity to methane than that of the unloaded powder. Probably the mechanism of methane sensing consists of two steps, i.e. activation of methane molecules on the supported Pd catalyst and surface reaction of the activated species on the tin oxide particles. The 1st step is rate determining at 658 K, while the 2nd step becomes also important kinetically at 573 K, allowing the promoting action of Pt to take place.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the known catalysts of Kim or Moseley in the Timoshenko method because of their known sensitivity to combustible organic compound gases as shown by Kim or Moseley and because of the low temperature use as shown by Moseley. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a thermistor resistance optimal for the sensing environment because as held by the Court the discovery of an optimum value of a known result effective variable without producing any new or unexpected results is within the skill of the routineer in the art (*In re Boesch*, 205 USPQ 215 (CCPA 1980)) and the selection of a known material based on its suitability for the intended use is within the skill of a routineer in the art (*In re Leshin*, 125 USPQ 416 (CCPA 1960)).

3. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection. The newly cited and applied Kim and Moseley references show that the newly claimed catalyst is known in sensors for detecting organic compounds.

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additionally cited art relates to gas sensors and the types of materials that can be used as thermistors.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arlen Soderquist whose telephone number is (571) 272-1265. The examiner can normally be reached on Monday-Thursday and Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Arlen Soderquist
Primary Examiner